SREP FUNDING PROPOSAL **Project Approval Request**			
1. **Country/Region**:	*Maldives*	2. **CIF Project ID#**:	(Trustee will assign ID)
3. **Program Title:**	*Preparing Outer Island Sustainable Electricity Development Project*		
4. **Type of SREP Investment**	*Private:*	*Public: X*	*Mixed:*
5. **Funding Request (in US million total) for Project:**	*Grant: USD 12,000,000*[1]	*Loan:*	
6. **Approved Preparation Grant**	*Amount (USD): 700,000*[2]	*Date: December 2012*	
7. **Implementing MDB:**	*Asian Development Bank (ADB)*		
8. **Other MDB Involvement**	*MDB: n/a*	*Type of Involvement:*	
9. **National Project Focal Point**:	*Mr. Ajwad Mustapha, Permanent Secretary* *Ministry of Environment and Energy*		
10. **National Implementing Agency for project:**	*Ministry of Environment and Energy (MEE)*		
11. **MDB SREP Focal Point and Project Task Team Leader (TTL)**:	*HQ-SREP Focal Point for ADB:* *Mr. Jiwan ACHARYA* *(jacharya@adb.org)*	*TTL for ADB:* *Mr. Priyantha WIJAYATUNGA* *(pwijayatunga@adb.org)* *and* *Mr. Len GEORGE* *(lgeorge@adb.org)*	

12. **Project Description:**

Summary of the Project

The proposal is part of the Maldives County Operations Business Plans (COBP) for 2014–2016 and supports the country's development objectives of reliable, affordable, and sustainable energy supply to all citizens as a basic right; promotion of renewable energy technology applications, energy efficiency, and energy conservation and greater energy security of the country; protection of the environment and people's health from hazardous effects of energy production; and reduction of greenhouse gas emissions.

The proposed *Preparing Outer Island Sustainable Electricity Development (POISED) Project* will transform the existing mini grids through physical investments in renewable energy, energy management and control systems, storage and improvements in distribution networks. The expected project outputs are:

(i) Output 1: Renewable energy ready mini grid systems developed for outer islands. It includes detailed design and procurement of equipment for solar diesel hybrid mini grids for about 160 medium and small outer islands. It will commence in 2014 with investments on 5 sample sub-projects for which due diligence was completed in 2014. These include the islands of S. Addu, B. Goidhoo, Th. Buruni, Ga. Vilingili and

[1] The $12.00 million excludes the USD 0.700 million project preparation grant and the $0.400 million TA support.
[2] A grant of $208,000 was previously utilized for preparation of the MAL SREP Investment Plan.

Lh. Khurendoo. Further islands would be selected for installations using a defined eligibility criterion and with co-financing from additional sources.

(ii) Output 2: Enhanced capacity of Ministry of Environment and Energy, STELCO, Fenaka to implement renewable energy mini grids. It will commence in 2014 with procurement of services to support implementation including project management, technical support, financial management, safeguard support and training.

The investments under the project are for renewable energy based electricity generation and energy efficiency improvements at the generation and distribution of electricity. The first phase in 2014 will also include investments in equipment to monitor, and transmit data on energy mini-grids to regional offices and headquarters.

Access to Energy and Potential Energy Resources

Maldives is a geographically dispersed country with 1,192 islands (194 inhabited and 105 self-contained tourist resorts) spread over 900 kilometers (km). Total land area is 300 square km with average island size of 25 hectares. It has an estimated population of 330,652 (2012). About half the country's population lives in the outer islands.

While the Maldives has the unique distinction of being the first and the only country in South Asia with 100% access to electricity, this achievement has come at a cost. Given the geographic location of islands, each island is electrified with its own diesel powered mini grid system resulting in expensive and not very reliable supply as diesel is transported and distributed to each outer island. The electricity generation cost in Maldives at US$0.30-0.70 per kilowatt-hour (KWh) is among the highest in South Asia. To make electricity affordable, tariff is subsidized by the government but still remains high for consumers, and varies from island to island. Electricity sector subsidies remain a large burden on public expenditure and this one of identified areas for government expenditure management.

In 2012, Maldives spent over $470 million for oil imports of which fuel imports for electricity generation are a significant share. This is unsustainable in the context of volatile fuel prices and increasing energy consumption. The 100% diesel dependence of Maldives also makes its carbon emissions per unit of electricity among the highest in the region.

The Maldives has significant renewable energy resources namely solar power and in some pockets wind power. Among renewable energy sources, the solar resource is abundant and offers the potential to displace existing diesel-fired electricity generation. There is little spatial variation in solar power insolation ranging from 7kWh/m2/day to a minimum of 4.5 kWh/m^2/day. Energy sector studies reveal that energy generation based on renewable energy and fossil fuel hybrids would reduce the cost of supply in the foreseeable future compared to the current situation.

The government targets increased use of indigenous renewable energy in the country to diversify and support planned energy efficiency initiatives. Renewable energy is yet to be commercially harnessed at a significant scale and integrated into the grid in a reliable manner. The Government has a national energy policy and a sector roadmap to convert outer islands to renewable energy hybrid mini-grids. The roadmap is viable and technology has been selected based on the operational requirements, local conditions and capacity for operation and maintenance in remote islands. An investment plan has been prepared to reduce the diesel

dependence for electricity generation of the outer islands.

Consistency with Key SREP Investment Criteria

Increased RE capacity and increased access to energy via RE: The project will directly facilitate solar-diesel hybrid mini-grid installations to 160 outer islands with approximately 21 MW solar capacity and annual electricity output of 27.6 GWh (assuming 15% output) directly supported. In addition, private sector renewable energy generation projects on Fenaka and STELCO islands would be enabled through public sector led investments to strengthen the electricity grids.

Phase 1 with 5 sample island projects will benefit about 4,600 households.

Low-emissions development: The 100% diesel dependence makes the country's carbon emissions per unit of electricity among the highest in the region. The proposed hybrid mini-grids system will displace large portion of diesel and gasoline used in generator sets. The diesel consumption in outer islands is around 0.45-0.70 liters/kWh (2012 baseline); with the implementation of the project, consumption will be reduced to 0.1-0.3 liters/kWh. The reduced diesel consumption will translate to greenhouse gas reduction estimated at 40,000 tons carbon dioxide equivalent per year (tCO_2e/y) or 1.0 million tCO_2e over 25 years of project lifetime.

Affordability and competitiveness of RE: The use of solar-diesel hybrid system will substantially reduce the use of diesel in the 160 medium and small islands. This will enable a reduction in fuel imports. Similarly, with the additional solar capacity installed, the cost of electricity in these islands will be reduced. The current cost of diesel power is unaffordable at $0.30-0.70/kWh and requires heavy government subsidies.

Productive use of energy: The sustainable, affordable, and quality power supply will promote productive energy use in the outer islands. The community outreach program will increase awareness on renewable energy and household-demand side management to enhance energy efficiency at the household level. The reliable and quality supply of electricity will encourage microenterprise development to use available energy particularly during the daytime.

Economic, social, and environmental development impact: The project will provide direct benefits to the targeted island communities. It will lead to socio-economic improvements in the livelihoods of project targeted families and individuals. Economic benefits will accrue from the reduced electricity prices resulting from less expensive power generation, and livelihood improvement, including opportunities from microenterprise development (e.g. cottage based industries). On social and environmental benefits, benefits will come from the reduced noise, conventional pollutant emissions, and ecological and public health impacts from fuel spills. Community representation and participation will foster positive attitudes and strengthened communities in ensuing economic development.

Economic and financial viability: The project was analyzed for economic viability in accordance with ADB's Guidelines for the Economic Analysis of Projects (1997). The project is economically viable with non-incremental benefits alone outweighing the costs. The EIRRs of the 5 sample projects range from 14% to 40%. Sensitivity analysis shows that the project returns are robust against changes to critical variables. The project will support the reduction 40,000 tons of CO2 in 2019 against the baseline emissions in the power sector.

Financial analysis of the project was carried out in accordance with ADB's Financial Management and Analysis of Projects. The weighted average cost of capital was estimated at 1.2% (in post-tax real terms). Based on conservative assumptions adopted for base case analysis, the FIRR for the sample projects exceeds the WACC for all sample sub-projects.

Although the project is deemed financially and economically viable under ADB evaluation guidelines, upfront capital costs for renewable energy systems are still a constraint, and at present, neither the FIRR nor the business of installing, operating and maintaining electricity grids across 160 islands is considered attractive for private investors. The declining capital cost of solar-based mini-grids makes the technology commercially viable, and bulk procurement will be employed to further reduce the capital costs. SREP financing will further buy down the cost of solar energy, facilitating the longer-term transition to a carbon neutral economy.

Leveraging of other financing: The ADB will provide a grant amount through its Special Funds resources. Additional co-financing will come from Islamic Development Bank (IsDB), European Investment Bank (EIB), and government counterpart funds. Funds from the development partners will be on lent to STELCO and Fenaka by the government.

There is growing interest among private sector to participate in complementary investment in a few large outer islands and this would depend on ADB's public sector investment program to prepare the mini grids for higher levels of renewable energy investment as well as the World Bank's partial risk guarantee program that is under design. Capacity development assistance under the ongoing technical assistance to the Maldives Energy Authority and the Ministry of Energy and Environment will be enhanced to provide assistance for private sector investments.

Complementary support from ADB's Private Sector Operation Department (PSOD) is also being considered for this overall initiative.

Gender: The project is classified as an Effective Gender Mainstreaming project by ADB. The project's Gender Action Framework will have the following outputs: (i) household demand-side-management program to improve energy efficiency, targeting women household consumers, which will link up with and further develop the utilities' Corporate Social Responsibility (CSR)-community outreach program; (ii) enabling environment for women's microenterprise development, (iii) promoting women's employment and training during project construction and subsequent systems operation and maintenance in the outer islands, (iv) training for utility staff in gender inclusive community outreach approaches, and (iv) a gender mainstreamed monitoring system.

The Island Women's Development Committees will be mobilized for community outreach and awareness raising activities.

Co-benefits: At the impact level, the project will increase renewable energy supply mix in the country to 25% (by 2022) from less than 1% in 2009 (baseline). It will create short- and long-term employment opportunities during construction, and operations and maintenance of the project. Reliable and quality supply of energy will improve social services such as in community health centers and schools. There will be direct public health and environmental benefits through reducing conventional pollutant emissions (including black carbon) as well as GHG emissions.

The project will also enhance the institutional and operational capacity among Fenaka and Stelco staff (at least 25% of the participants are women) to implement renewable energy mini-

grid and scale up proven solutions.

13. **Objective**

To increase RE capacity and access to sustainable energy on a programmatic basis.

14. **Expected Outcomes:**

- Increase in renewable energy produced by mini grid energy projects
- Increase in number of villages, households, and people with access to clean/renewable electricity
- Enhance the capacity of Ministry of Environment and Energy, STELCO, Fenaka

15. **Key Results and Indicators for Success (consistent with SREP results framework):**
The performance indicators outlined below are derived from the SREP Results Measurement Framework. These indicators will be tracked at least annually. Suggested performance indicators for the project include:

Result	**Indicator**
(a) Annual electricity output from renewable energy as a result of SREP interventions (GWh/yr)	21 MW of new solar capacity with 27.6 GWh/y output and 7 MWh of energy storage
(b) Number of business and community services benefiting from improved access to electricity and fuels as a result of SREP interventions	About 4,600 households with increased access to electricity in the first 5 sub-projects. The number will increase as a larger set of islands are covered under the program.
(c) Increased public and private investments in targeted subsectors as a result of SREP interventions ($ million)	$ 102 million are indicated as investments that the POISED project would directly support. This does not include private investment that would be enabled on the islands once the electricity grids are strengthened.
(d) Avoided greenhouse gases - Tons per year - Tons over 25 year lifetime	 About 40,000 tCO_2e/y About 1.0 million tCO_2e/y

16. **Budget:**

Expenditures[3]	**Amount (USD) –** estimates [SREP funds only]	
1. Capacity Development		
Project Management Unit, MEE, STELCO, Fenaka	0.00	
2. Investment Components		
Renewable package procurement	11,025,000.00	
Contingencies	975,000.00	
Total Cost	**12,000,000.00**	
Co-Financing:	*Amount:*	*Type of contribution:*
• MDB: ADB	38,000,000.00	Grant
• Other: Islamic Development Bank	10,000,000.00	Soft Loan
• Other: European Investment Fund	40,000,000.00	Loan
• Government	14,000,000.00	GOM counterpart funds
Co-Financing Total	**102,000,000.00**	

[3] These expenditure categories may be adjusted during project implementation according to emerging needs. The amounts listed are for SREP funds only; a detailed breakdown of the financing plan is presented in the draft Report and Recommendation of the President.

17. **Program Timeframe**

For ADB
Expected Board/MDB Management[4] approval date: Q3 2014
Expected Mid-Term review date: Not applicable (periodic reviews will take place)
Expected Program closure[5] date: 31 December 2019

18. **Role of other Partners involved in program**[6]:

The Asian Development Bank (ADB) will assist in the selection of external experts to be recruited under POISED to provide support to Project Management Unit (PMU, at the Executing Agency level) and Project Implementation Units (PIU, at the implementing agency level). It will clear and approve bidding evaluation report and bidder contracting. Confirmations on the roles and responsibilities of partner agencies will be done in July 2014.

19. **Implementation Arrangements** (incl. procurement of goods and services)**:**

The executing agency will be the Ministry of Finance and Treasury (MOFT) and the implementing agencies will be composed of Ministry of Environment and Energy (MEE), Fenaka and STELCO.

A Project Management Unit (PMU) comprising the officials from Ministry of Environment and Energy (MEE), Fenaka and STELCO has been setup for coordination of activities under the project. Project Implementation Units (PIUs) will be established in FENAKA and STELCO to assist in preparing overall implementation plans, contract packaging, and annual budgets. PIUs will also be responsible for overall intra-agency and intra-department coordination; bid management, project management, monitoring and evaluation of project outputs and results. Please refer to Draft RRP for detailed discussion of implementation arrangements. The sub-project selection and implementation would be done atoll wise for better investment related planning and ease of implementation

Implementation arrangements are summarized in Table 1.

ADB will follow ADB's policy on procurement. For more information, please refer to:
http://www.adb.org/sites/default/files/Guidelines-Procurement.pdf

[4] In some cases activities will not require MDB Board approval.
[5] Financial closure date.
[6] Other local, national and international partners to be involved in implementation of the program.

Table 1: Implementation Arrangements

Aspects	**Arrangements**		
Implementation period	June 2014 – December 2019		
Estimated completion date	31 December 2019		
Management			
(i) Oversight body	Inter-ministerial steering committee comprising ministers from Finance and Treasury, Environment and Energy, Economic Development Government of Maldives		
(ii) Executing agency	Ministry of Finance and Treasury, Government of Maldives		
(iii) Key implementing agencies	MEE, Fenaka and STELCO		
(iv) Implementation unit	Project Management Unit (PMU) located at MEE, 7 staff proposed. Project Implementation Units (PIU) at STELCO and FENAKA		
Procurement	International competitive bidding	6 contracts (under ADB) EIB, IsDB to follow own procurement guidelines	$ 44 million
	National competitive bidding	none	
Consulting services	QCBS	Firm based contract	$ 3 million
Retroactive financing and/or advance contracting	Retroactive financing to be requested for eligible expenditure on equipment, civil works and implementation services, not exceeding the amount of 20% of the estimates, incurred before grant effectiveness but not earlier than 12 months before the signing of the grant agreement. Advance contracting		
Disbursement	The grant proceeds will be disbursed in accordance with ADB's *Loan Disbursement Handbook* (2012, as amended from time to time) and detailed arrangements agreed upon between the government and ADB.		

EIB = European Investment Bank, IsDB = Islamic Development Bank, MEE = Ministry of Environment an Energy, PIU = project implementation unit, PMU = project management unit, STELCO = state electricity company
Source: ADB Staff Estimates.